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EXAMINER	
LU, CHARLES EDWARD	
ART UNIT	PAPER NUMBER
2161	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/624,278	MACLENNAN ET AL.	
	Examiner	Art Unit	
	CHARLES E. LU	2161	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23,25-28 and 30-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23,25-28 and 30-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Action is in response to the amendment dated 6/10/2009. Claims 1-23, 25-28, and 30-35 are pending and rejected.

Response to Arguments/Response to Amendments

2. The claim objections are withdrawn in view of the amendments.

Applicant's arguments regarding the 103 rejections were fully considered. Applicant argues the claims as amended. The new grounds/interpretation of the prior art is necessitated by amendment, and the prior grounds of 103 rejection are withdrawn.

Applicant further argues that Vishnubhotla does not teach or suggest reprocessing a particular mining model in response to a change with respect to variables in a respective mining structure, where the mining model was created from the mining structure. The examiner respectfully disagrees. An underlying data set is understood to read on a claimed mining structure, since the broadest reasonable interpretation is given to the term. For example, in Becker, the underlying data set (e.g., from mushroom or census data) is used to create mining models (also given the broadest reasonable interpretation). Similarly, Vishnubhotla teaches refreshing the mining models based on changes in the underlying data set. When combined with Becker, the claimed subject matter is met because the mining model would be reprocessed (refreshed) based on changes in a mining structure. In Becker, it is seen that the mining structures have variables and values for the variables. If the underlying data has changed, the change could be a value in the variable, the variable name (for

example) or both. Thus, it would have also been obvious to reprocess the mining models in response to a change with respect to the variables, as claimed, since the variables are part of the data set used to create the model. The motivation would have been to keep the models up to date with the data, since it is desirable for the models to accurately reflect the data on which they are based.

Applicant's arguments on pp. 24-28 depend on the above discussion.

Applicant further argues that Becker and Vishnubhotla does not teach or suggest (1) links between one or more mining models and the mining structure, (2) where the links facilitate changes relating to discretization of continuous variables being simultaneously reflected in each of the mining models created from the mining structures. However, as to (1), see the discussion in claim 6 (the claim in question depends from claim 6 as seen in the prior action). As to (2), it is first understood from (1) that the link would be used to correspond any changes in the underlying data set with the model to enable correct processing. It is also noted that, the combination would support that if the underlying data changes, the model can be reprocessed in response (see above). One example of a change to the underlying data set is discretization of the variables. Becker '483 teaches or suggests discretization when a binning resolution of data is arbitrarily chosen. Thus, the end result of the combination would be to support updating the mining model based on an arbitrary change in discretization of the underlying data set, as claimed. For this analysis, it is noted that the broadest reasonable interpretation has been given to the claims. For example, a

specific properties of a "link" that may be found in the specification are not read into the claims.

Applicant's arguments on pp. 29-36 depend on the above discussion.

Applicant's arguments regarding claims 30 and 32-34 depend on the above discussion. The new grounds of rejection presented below is necessitated by amendment. Regarding the issue of having one copy discretized in a first manner and another copy discretized in a second manner, the claimed subject matter would have been obvious given the combination that allows reprocessing of models based on arbitrary changes in the underlying data set (such as discretization). A user would desire flexibility in working with different resolutions of data. For example, a lower resolution copy of data would process faster and give a more general data view, while a higher resolution version may process slower, but give more quality. The user can keep both and/or an optimal model can be chosen. See below rejection.

Applicant's arguments on pp. 39-42 depend on the above discussion.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1, 3-10, 12-19, and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becker (U.S. Patent 6,301,579), hereinafter "Becker," and further in view of Vishnubhotla (US 2002/0198889), hereinafter "Vishnubhotla."

As to claim 1, Becker teaches the following claimed subject matter:

Accessing one or more of a plurality of data sets at a computing device configured to create mining structures from data sets, each data set storing data as cases (e.g., mushrooms, census, col. 10, ll. 30, 67, fig. 18A-B, col. 28), each case comprising:

A value in one or more of a plurality of variables, wherein the values represent characteristics of a subject of the case and each type of the plurality of variables corresponds to pre-determined data types (see above, fig. 18A-B, col. 28).

Retrieving data from a data set of the plurality of data sets at the computing device (col. 10, ll. 29-44);

Performing operations on a chosen one or more of a plurality of mining structures at the computing device (e.g., for adult census, mushrooms, also see col. 10-13 and fig. 18A and col. 28), the operations comprising:

Create, wherein the create operation sets up mining structures by creating one or more mining structures using data retrieved from the data set (see fig. 17), wherein each mining structure describes how the data will be modeled for data mining, the creating comprising:

Defining one or more of a plurality of mining structure variables as the variables from the data structure that will be used in the mining structure (col. 10, l. 44 – col. 11, l. 40).

Defining one or more of a plurality of acts of processing to be performed on the retrieved data, wherein the one or more acts may be performed on a subset of the retrieved data (see above and col. 29, ll. 16-48).

Process, wherein the process operation performs initial processing on the retrieved data from the data set for mining model creation by performing processing on the retrieved data, wherein processing occurs only on the subset of data determined necessary per the definitions in the mining structure (see above, building a base level of records, col. 11, l. 48);

Clear, wherein the clear operation removes data from a processed mining structure (fig. 18A, col. 28, ll. 15-20);

Drop, wherein the drop operation deletes each chosen mining structure (see above, fig. 18A, "Remove Column" also clears data and deletes each chosen mining structure when, for example, all columns are removed).

Update, wherein the update operation causes the mining structure to be reprocessed from the data set (fig. 18A, col. 28, ll. 1-15). Note that the mining structure must be reprocessed from the data set so that the structure contains the correct added/removed columns and/or filtered data.

Query, wherein the query operation returns the requested values from the mining structure (e.g., col. 22, l. 54). Note also that a query operation must be performed of lower level data (e.g., data file) to obtain data to create a higher level table in tables 1-3);

Storing results of operations performed on the data in the mining structure at the computing device (see above, note that the results must be stored to build upper levels of a decision table).

Ascertaining the existence of (determining at the computing device) one or more mining structures (data files or training sets) available for mining model creation (this must happen in order to create a decision table from the data file, see col. 11, ll. 46-50).

Based on the mining structures, creating, at the computing device, a plurality of mining models (e.g., upper levels of decision table), wherein each mining model is predictive of chosen characteristics based on the values obtained from mining structure variables (see col. 10-12) and the plurality of mining models includes a first mining model created from a first mining structure of the plurality of mining structures (one level of hierarchy of table 1-3 created from the base table for mushrooms) and a second mining model, different from the first mining model, created from the first mining structure (another different level of hierarchy of table 1-3 created from the base table for mushrooms, see section starting at col. 11, l. 41).

Providing results of the creation of the one or more mining models at the computing device (table 1-3, see "iv. Example Visualization of a Decision Table Classifier," col. 15, l. 53).

Becker does not expressly teach a "key value."

However, Becker could implement a claimed "key value which uniquely identifies the corresponding case" because Becker discloses uniquely identifying data in a record (col. 33, ll. 18-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Becker, such that the data set is organized in record format with a key (uniquely identifying the record) and a value in one or more

variables, since one of ordinary skill in the art would have been motivated to facilitate data organization for a data set, and to yield high data set accuracy, as taught by Becker (col. 33, ll. 18-20).

Becker teaches mining structures and mining models, as discussed above, but does not expressly teach determining whether at least one mining structure is available for mining model creation, creating a plurality of mining models when at least one mining structure is available, and creating the plurality of mining models based on the data sets when the mining structure is not available.

However, Becker as applied above teaches that a mining model is created using a mining structure (see above). The "mining structure" is, for example, a data file that serves as a base level of records for the mining model (col. 11, ll. 46-50). Thus, the mining model could depend on whether the data file was created, and if the data file cannot be found (or was not created), a mining model may not be created. Furthermore, before the first creation of a data file from a data set, no data file is yet created from a data set, and thus, a user could detect that no mining structure is currently available, and create the mining structure before the models (see fig. 18A or Becker).

Moreover, it has been held that automating a manual process is obvious. *In re Venner*, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958). In this case, it would have been obvious to automate the manual activity of determining whether initially needed data exists before creating other data that depends on the initial data.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Becker, to detect if the data file does not exist, and if the file does not exist, the file will be created. As such, Becker as modified would determine whether a structure is available for model creation, and if so, create the model(s), and if not, create the mining structure first before proceeding to create the models. Thus, the claim limitations would be met. The end result would be to provide data necessary for model creation if that data did not initially exist. The motivation would have been to facilitate smooth operation of the system (it is undesirable to act on data that does not exist) and to ensure that the system possesses all the data necessary for successful operation, as known to one of ordinary skill in the art.

Becker as applied above teaches processing, mining models and mining structures, wherein the particular mining model was created from the respective mining structure, but does not expressly teach reprocessing the model "in response to a change in a respective mining structure."

However, Vishnubhotla discloses refreshing a mining model because the underlying data changes over time (para. 0075).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Becker, such that the mining models are refreshed as the underlying data in the data structures changes. The motivation would have been to facilitate keeping data up to date, as known to one of ordinary skill in the art.

Since the model is created from changed underlying data, and the underlying data has variables, the combination above further teaches or suggests reprocessing "in response to a change with respect to variables" as claimed. Furthermore, the combination would support wherein the first mining model is used to predict values of a first variable of a data set, and a second model is used to predict values of a second variable of the data set (e.g., depending on how the user wants to interpret/visualize the data, the user can use each of the levels to predict values of a first or second variable of the data set; table 1-3; col. 13, l. 31 – col. 14, l. 10);

As to claims 3-5, Becker as applied above teaches when two mining structures created from the same data set are not equal with respect to their cases, and mining structure variables. See fig. 18A and various data manipulation tools available to create a different mining structure from the same data set (col. 28, ll. 1-30).

As to claim 6, Vishnubhotla as applied above further teaches wherein links between the one or more of a plurality of mining models and the mining structure from which each mining model was created are stored, facilitating changes in one or more mining structures being simultaneously reflected in each of the one or more mining models created from each of the changed mining structures. In order to refresh a mining model in response to a change in the underlying data structure, a “link” as claimed between model and structure must be stored to remember the correspondence between the mining model and mining structure and to refresh/update values correctly.

As to claim 7, Becker as applied above further teaches evaluating, at the computing device, two or more mining structures created using data from the same data

set by comparing to each other at least one mining model created from each of the two or more mining structures, and providing the results of the comparison (col. 29, ll. 13-47). Note that in, e.g., holdout, an induced classifier, created from two thirds of the data, is compared with classified data, occurring from the remaining one-third of the same data. This is performed to determine the accuracy of the classifier. Thus, two or more underlying mining structures are evaluated as claimed.

As to claim 8, Becker as applied above further teaches providing two or more mining models created from the same mining structure for comparison at the computing device (see above, col. 13, ll. 1-63, col. 7, ll. 60-65).

As to claim 9, Becker as applied above further teaches accepting a drill through query for specified data at the computing device and providing said specified data at the computing device (col. 9, ll. 49-53).

Claims 10, 12-19, and 21-23 are rejected based on the same reasoning as one or more of the above claims. For example, claim 19 is drawn to substantially the same subject matter as at least claims 1 and 6 discussed above and is rejected based on the same reasons. As to claim 10, the combination would further support "wherein the change in the respective mining structure includes a change in the processing of data from the data set" (see Vishnubhotla above).

4. Claims 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becker in view of Vishnubhotla , and further in view of Becker (US Patent 6,373,483), hereinafter "Becker '483."

Claim 25 is drawn to substantially the same subject matter as claim 19, discussed above, in addition to "facilitating changes relating to discretization of continuous variables…changed mining structures…based on changing a number of ranges…is discretized, " in which the combination does not expressly teach.

However, Becker '483 teaches that in binning, a binning resolution is chosen to achieve faster processing (col. 7, ll. 55-58). Binning is discretization of a continuous variable into ranges (e.g., see throughout Becker '483 and also the first Becker reference, col. 11). Since Becker '483 discloses choosing an arbitrary resolution, it is possible that a user could choose any resolution he/she desires.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Becker and Vishnubhotla, such that in the reprocessing, the variables are binned using a binning resolution different from the initial binning resolution (e.g., col. 11 of first Becker reference). Thus, the claimed subject matter would be met. The motivation would have been to affect the processing speed as taught by Becker '483 (col. 7, ll. 55-58). Furthermore, one of ordinary skill in the art knows that choosing a lower resolution tends to increase processing speed. Thus, lowering the binning resolution during reprocessing is desirable where faster processing is needed, while increasing the binning resolution is desirable where higher resolution is needed without concern for processing speed.

Claims 26-28 are rejected based on the same reasoning as one or more of the above claims.

5. Claims 2, 11, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becker in view of Vishnubhotla and further in view of Smith et al (U.S. Patent 6,591,274), hereinafter "Smith."

As to claim 2, Becker/Vishnubhotla as applied above teaches mining structures, but does not expressly teach "serving as first class objects in a database."

However, Smith teaches serving as first class objects in a database (col. 4, ll. 5-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Becker/ Vishnubhotla, such that the mining structures serve as first class objects in a database. The motivation would have been to facilitate accessing data from a data store, as taught by Smith (col. 1, l. 48 – col. 2, l. 20).

Claims 11 and 20 are rejected based on the same reasoning as one or more of the above claims.

6. Claims 30 and 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becker in view of Becker '483 and further in view of Bloom et al. (US 2003/0212678) and Vishnubhotla.

As to claim 30, Becker as applied above teaches or suggests a processing unit and system memory (fig. 20), data sets stored in system memory organized as cases (see above), a key value (see above), a value in variables, each variable type corresponding to data types (see above), mining structures stored in system memory (fig. 20) created from a data set (see above), a structure wherein processing occurs

only on data necessary per definitions in the mining structure and includes discretizing, wherein definitions indicate that a first number of mining structures include continuous variables discretized in a first manner (see above, col. 10-12), a container wherein processed information is stored in the system memory (see fig. 20), a plurality of mining models created from a mining structure, one mining model not equal to another mining model (see above), providing results (see above), and wherein a first copy of the mining model generated from a respective data structure includes the continuous variables discretized in the first manner (see above).

Becker does not expressly teach a second number of mining structures include the continuous variables discretized in a second manner and a second copy of a mining model created from a respective structure that includes continuous variables discretized in the second manner.

However, Becker '483 teaches that in binning, a binning resolution is chosen to achieve faster processing (col. 7, ll. 55-58). Binning is discretization of a continuous variable of a data set in some manner (e.g., see throughout Becker '483 and also the first Becker reference, col. 11). Since Becker '483 discloses choosing an arbitrary resolution, it is possible that a user could choose any resolution he/she desires. In addition, Bloom teaches or suggests the claimed subject matter (¶¶ 0005-0006, 0009-0011, 0098, 0114).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Becker, such that binning using a different resolution is allowed, and another copy of the mining model based on the differently

discretized data set can be created. As such, the claimed subject matter would be met. The motivation would have been to affect the processing speed as taught by Becker '483 (col. 7, ll. 55-58). Furthermore, one of ordinary skill in the art knows that choosing a lower resolution tends to increase processing speed. Thus, lowering the binning resolution during reprocessing is desirable where faster processing is needed, while increasing the binning resolution is desirable where higher resolution is needed without concern for processing speed. A motivation for having two copies based on different resolutions would have been to allow a user more flexibility in interpreting data, as known to one of ordinary skill in the art. For example, the lower resolution version would be processed faster and give a more general data view. A further motivation for having two copies as claimed is to facilitate choosing the best model as taught by Bloom (e.g., ¶¶ 0005-0006).

The combination above would further teach or suggest wherein the first copy of the model is used to predict values of one or more variables of the data set and the second copy is used to predict values of one or more variables of the data set (e.g., See Becker above and Bloom, ¶¶ 0014-0016), as well as changes in discretization (e.g., Becker '483 and Bloom above), but would not expressly teach reprocessing the first/second copies of the model in response to a change of the respective mining structures (via discretization) as claimed.

However, Vishnubhotla discloses refreshing a mining model because the underlying data changes over time (para. 0075). In order to refresh a mining model in response to a change in the underlying data structure, a "link" as claimed between

model and structure must be stored to remember the correspondence between the mining model and mining structure and to refresh/update values correctly. As seen above, discretization is a way that the underlying data can change.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Becker/Becker '483 and Bloom, such that the mining models are refreshed and links are stored as the underlying data in the data structures changes due to a change in discretization. Thus, the claimed subject matter would be met. The motivation would have been to facilitate keeping data up to date, as known to one of ordinary skill in the art.

Claims 32-34 are rejected based on the same reasoning as one or more of the above claims.

As to claim 35, see the discussion for claim 30 above.

7. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Becker in view of Becker '483 and further in view of Bloom, Vishnubhotla, and Smith et al (U.S. Patent 6,591,274), hereinafter "Smith."

As to claim 31, Becker/Becker '483/Bloom as applied above teach mining structures, but does not expressly teach "serving as first class objects in a database."

However, Smith teaches serving as first class objects in a database (col. 4, ll. 5-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Becker/ Becker '483/Bloom, such that the mining structures serve as first class objects in a database. The motivation would have been to

facilitate accessing data from a data store, as taught by Smith (col. 1, l. 48 – col. 2, l. 20).

Conclusion

8. Applicant's amendment necessitates new grounds of rejection/interpretation of the prior art of record. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E. Lu whose telephone number is (571) 272-8594. The examiner can normally be reached on 8:30 - 5:00; M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu Mofiz can be reached at (571) 272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Charles E Lu/
Examiner, Art Unit 2161
8/21/2009

/Apu M Mofiz/

Supervisory Patent Examiner, Art Unit 2161